

June 2, 1936.

T. W. BEHAN

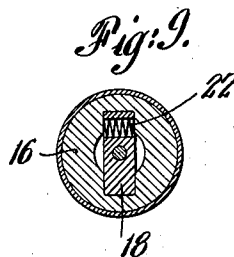
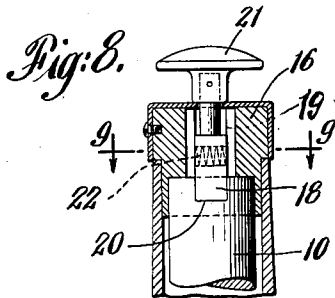
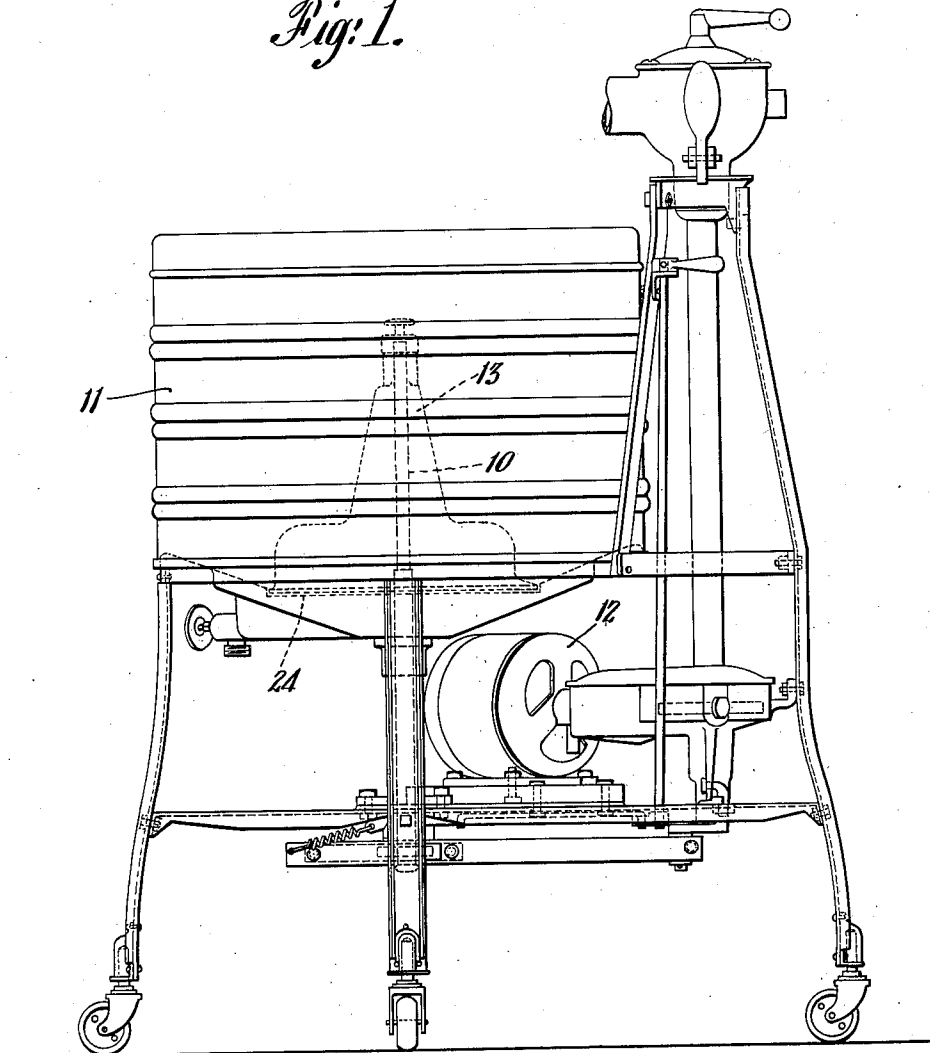
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AGITATOR FOR WASHING MACHINES

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2 Sheets-Sheet 1

Fig. 1.



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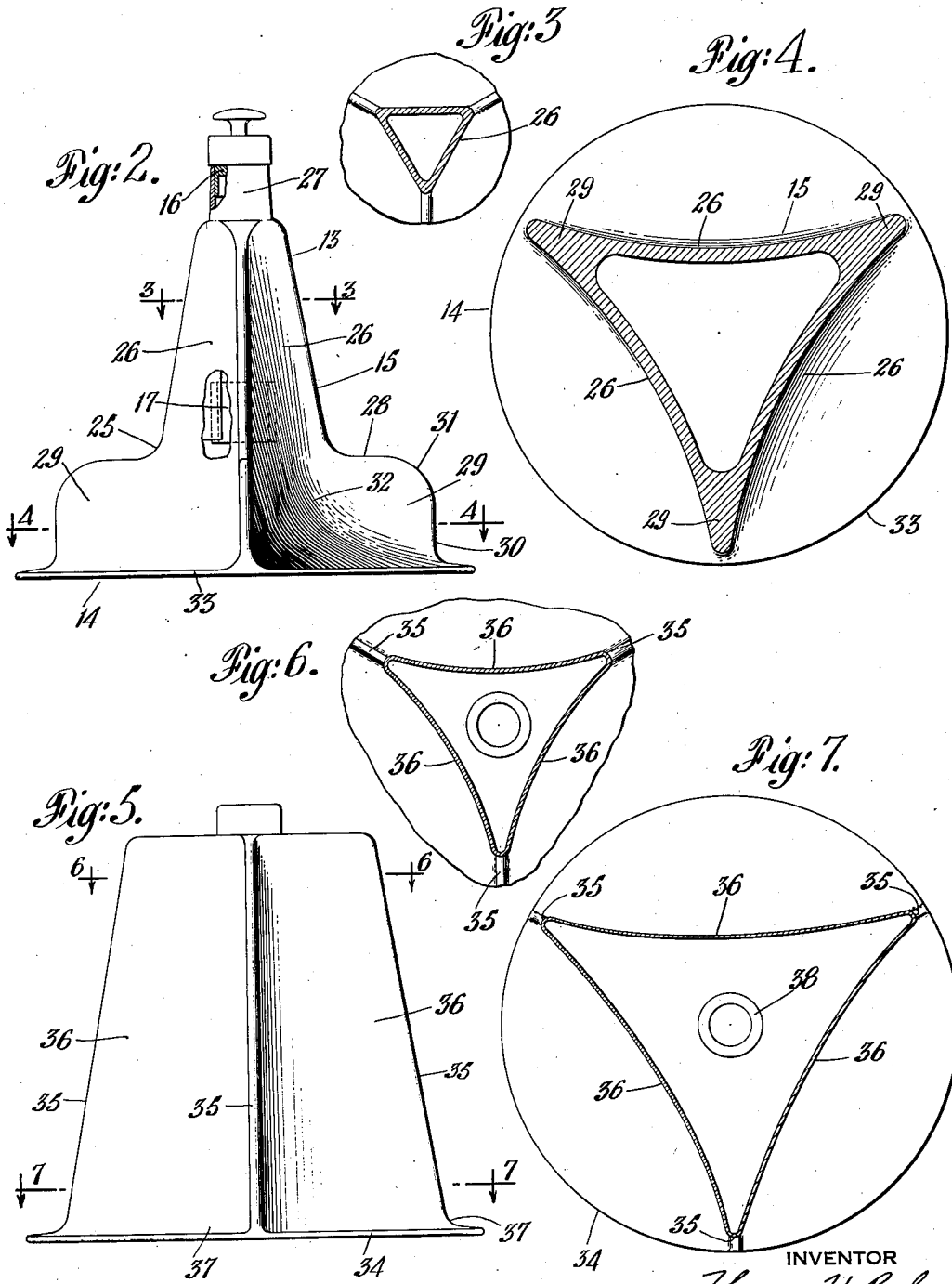
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AGITATOR FOR WASHING MACHINES

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AGITATOR FOR WASHING MACHINES

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5 Claims. (Cl. 259—101)

This invention relates to improvements in agitators for washing machines. It has been a primary object of the invention to devise an agitator which is simple and inexpensive to manufacture and one which will require a minimum amount of power for its operation. This enables use of the improved agitator in a machine provided with a smaller motor, considering the capacity of the machine, than it has heretofore been possible to employ. At the same time a relatively high efficiency in the washing of clothes has been maintained.

Other objects and advantages of the invention will appear from a detailed description of several illustrative forms of the same which will now be given in conjunction with the accompanying drawings in which:

Fig. 1 is an elevational view of a washing machine embodying the improved agitator.

Fig. 2 is an enlarged elevational view of one form of the improved agitator.

Fig. 3 is a transverse sectional view along the line 3—3 of Figure 2.

Fig. 4 is a transverse sectional view along the line 4—4 of Figure 2.

Fig. 5 is an elevational view of a modified form of the improved agitator.

Fig. 6 is a transverse, sectional view along the line 6—6 of Figure 5.

Fig. 7 is a similar transverse, sectional view along the line 7—7 of Figure 5.

Fig. 8 is a detail, vertical sectional view showing the connection between the agitator and the spindle, and

Fig. 9 is a detail, sectional view along the line 9—9 of Figure 8.

Referring now to the drawings, the agitators illustrated are adapted to be applied to a machine having a central spindle or post 10 extending upwardly through the bottom of a tub 11 to a point adjacent the top. Any suitable means, well known in the art, may be provided for imparting an oscillating movement to the spindle 10. A motor 12 may be utilized as the power source.

The agitator, designated generally by the character 13, is formed with an outwardly flaring base portion 14 and a vertically extending body or shank portion 15. The latter at its upper end may carry a bushing 16 adapted to snugly fit the upper end of the spindle. Adjacent the lower end of the shank portion there is provided a second bushing 17 adapted to engage the spindle at a lower point. These bushings are preferably formed of brass or bronze or similar good bearing

material while the main body of the agitator is preferably constructed of aluminum, or similar material, which may be readily cast. By the selection of aluminum for this purpose, a construction which is sufficiently sturdy is provided and at the same time it is relatively light and will reduce the burden placed upon the motor to oscillate it. The bushings may be introduced into the casting and held in any suitable way, as by forcing them into recesses or pockets adapted to receive them.

Provision is made for connecting the agitator to the operating spindle and for effecting a disconnection to permit the spindle to rotate independently. The means for this purpose comprises a vertically disposed key 18 slidably mounted in an elongated slot 19 formed in the upper end of the shank of the agitator. The key is adapted to be forced into a slot 20 formed in the upper end of the spindle and when so engaged will connect the spindle and agitator for joint rotation. When the key is lifted, however, by means of a knob 21, to disengage it from the slot 20, the spindle 10 may be rotated independently of the agitator. A spring detent 22 may be provided in a suitable aperture in the key 18 to frictionally retain the key in elevated position.

The outer contour of the agitator is such that its surface is smooth and free from sharp, angular projections or corners which would be apt to harm the clothes during the washing action. The base portion 14 is preferably circular in contour and may be of sufficient diameter to substantially fill a slight depression 24 formed in the bottom of the tub. The shank portion rises from the base in the form of a three sided, pyramidal structure which is merged along smooth, sweeping lines with the base and with a slender portion, triangular in cross-section as shown in Fig. 3, adjacent the top of the agitator. For some distance down, say to a point 25, the shank may suitably be formed with substantially flat sides 26 flaring outwardly at a slight angle from top to bottom and producing a section in the nature of a frustum of a three sided pyramid. Above this section may conveniently be formed a cylindrical portion 27 which encases the bushing 16. At the point 25 along each edge of the pyramidal section a smooth curve of suitable radius merges this edge with a substantially horizontally extending ridge 28 forming the upper edge of a vane 29 that extends nearly to the edge of the base. The vertical edge 30 of each of these vanes is connected with the upper edge 28 by a well-rounded curved portion 31. Those portions

32 of the surface of the agitator which lie between the bottoms of the side portions 26, the vanes 29 and the flat edge portions 33 of the base are curved along sweeping arcs in all directions so as to form in effect small sections of spherical concavity. The edges between the sides 26 as well as the edges 28 and 30 are well rounded to avoid any danger whatever of tearing the clothes. While the surfaces 26 have been referred to as being flat, it will be understood that they are not necessarily so and in fact are preferably somewhat concave, particularly near their lower ends where they merge with the spherical sections 32.

In the operation of the agitator just described it will be apparent that the sweeping, smooth, curved surfaces between the three ridges will permit the water and the clothes within the tub to shift with considerable freedom across or relative to these faces. This will reduce to a minimum the resistance met with to the turning of the agitator and hence will require a minimum of power for its operation. At the same time, the vanes 29 will set up a churning action which will cause a rapid movement of the water through the clothes.

Referring now to Figs. 5 to 7, a modified form of agitator construction embodying certain features of the invention is disclosed. This modified construction lends itself readily to production from sheet metal although it may, if desired, be readily produced as a casting in the manner specified with respect to the first embodiment. As shown, it may comprise a flat base member 34 and a portion which rises vertically from the base. This vertical portion may be in the form of a three sided member having the meeting edges 35 of sides 36 tapering inwardly at a suitable small angle from a point at or adjacent to the edge of the base toward the top of the agitator. These sides are concave from top to bottom as shown, about an axis at an angle to that of the agitator substantially the same as the angle of inclination of the side faces, and except for this concavity produce a frustum of a three sided pyramid. The edges 35 and the lines of juncture 37 between the sides 36 and the base 34 are well rounded to avoid the formation of sharp shoulders or corners. The concavity of the sides is sufficient to create three vanes which are relatively slender adjacent their outer edges and which are joined by a smooth, sweeping arc of large radius. To permit application of the agitator to the oscillating spindle of a washing machine a bearing sleeve 38 adapted to snugly receive the spindle is suitably fixed along the longitudinal axis of the agitator. At its

upper end the sleeve may suitably be adapted for splined connection with the spindle. If this type of agitator is formed of sheet material, the sides may be separately formed or they may be formed of one sheet of material and the two free edges may be welded together. The base may be similarly secured by welding to the sides of the vertical portion or it may be formed as an integral, out-turned portion of the sides. The bearing sleeve may be secured in its central position in any convenient way as by welding, for example. The operation of this form of the invention is substantially the same as the first form, although the churning action upon the water is not concentrated to the same extent toward the bottom of the agitator.

While several illustrative forms of the invention have been disclosed in considerable detail in the foregoing, it will be understood that various changes may be made in the form and manner of construction of the agitator without departing from the general spirit and scope of the invention.

What I claim is:

1. An agitator having a disc-like base, a pyramidal upper portion, and an intermediate section having spherical, concave surfaces merging smoothly into the base and upper portion.

2. An agitator having a disc-like base, a pyramidal upper portion, and an intermediate section having spherical, concave surfaces merging smoothly into the base and upper portion, said intermediate section having extensions forming radially projecting vanes, the surfaces of said extensions merging in unbroken contour with said spherical surface.

3. An agitator having a disc-like base, a pyramidal upper portion having three sides, and an intermediate section having three spherical, concave surfaces merging smoothly into the base and upper portion.

4. An agitator for washing machines which comprises a disc-like base member, and a body portion in the form of a frustum of a pyramid, the outer faces of said frustum being concave completely across the same about substantially vertical axes parallel with the faces.

5. An agitator for washing machines which comprises a disc-like base member, and a body portion in the form of a frustum of a pyramid, the outer faces of said frustum from edge to edge being of increasing concavity from top to bottom about substantially vertical axes and being extended adjacent their lower ends to form radially projecting vanes.

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